Cisco CRS-1 Carrier Routing System Multishelf System Upgrade and Conversion Guide

Cisco IOS XR Software Release 3.4

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-12571-01

Cisco CRS-1 Carrier Routing System Multishelf System Upgrade and Conversion Guide

CONTENTS

Preface

This guide describes how to upgrade a single-shelf Cisco CRS-1 to a multishelf system. The upgrade process is similar to the process for a new multishelf system installation. This guide documents only the differences between the upgrade process and the new installation process.

The preface contains the following sections:

Changes to This Document

Table 1 lists the technical changes made to this document since it was first printed.

Table 1 Changes to This Document

Revision	Date	Change Summary
OL-12571-01	February 2007	Initial release of the document.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. This section explains the product documentation resources that Cisco offers.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a library of technical product documentation on a portable medium. The DVD enables you to access installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the HTML documentation and some of the PDF files found on the Cisco website at this URL:

http://www.cisco.com/univercd/home/home.htm

The Product Documentation DVD is created and released regularly. DVDs are available singly or by subscription. Registered Cisco.com users can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

Ordering Documentation

You must be a registered Cisco.com user to access Cisco Marketplace. Registered users may order Cisco documentation at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

If you do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Documentation Feedback

You can provide feedback about Cisco technical documentation on the Cisco Technical Support & Documentation site area by entering your comments in the feedback form available in every online document.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to do the following:

- Report security vulnerabilities in Cisco products
- Obtain assistance with security incidents that involve Cisco products
- Register to receive security information from Cisco

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For emergencies only—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.*x* through 9.*x*.

Never use a revoked encryption key or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT to find other means of encrypting the data before sending any sensitive material.

Product Alerts and Field Notices

Modifications to or updates about Cisco products are announced in Cisco Product Alerts and Cisco Field Notices. You can receive Cisco Product Alerts and Cisco Field Notices by using the Product Alert Tool on Cisco.com. This tool enables you to create a profile and choose those products for which you want to receive information.

To access the Product Alert Tool, you must be a registered Cisco.com user. (To register as a Cisco.com user, go to this URL: http://tools.cisco.com/RPF/register/register.do) Registered users can access the tool at this URL: http://tools.cisco.com/Support/PAT/do/ViewMyProfiles.do?local=en

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the **Cisco Product Identification Tool** to locate your product serial number before submitting a request for service online or by phone. You can access this tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link, clicking the **All Tools (A-Z)** tab, and then choosing **Cisco Product Identification Tool** from the alphabetical list. This tool offers three search options: by product ID or model name; by tree view; or, for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Tip Displaying and Searching on Cisco.com

If you suspect that the browser is not refreshing a web page, force the browser to update the web page by holding down the Ctrl key while pressing F5.

To find technical information, narrow your search to look in technical documentation, not the entire Cisco.com website. On the Cisco.com home page, click the **Advanced Search** link under the Search box and then click the **Technical Support & Documentation** radio button.

To provide feedback about the Cisco.com website or a particular technical document, click **Contacts & Feedback** at the top of any Cisco.com web page.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411
Australia: 1 800 805 227
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Online Subscription Center is the website where you can sign up for a variety of Cisco e-mail newsletters and other communications. Create a profile and then select the subscriptions that you would like to receive. To visit the Cisco Online Subscription Center, go to this URL:

  http://www.cisco.com/offer/subscribe

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco channel product offerings. To order and find out more about the *Cisco Product Quick Reference Guide*, go to this URL:

  http://www.cisco.com/go/guide

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- Cisco Press publishes a wide range of general networking, training, and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website where networking professionals share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- "What's New in Cisco Documentation" is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category to direct you quickly to the documentation for your products. You can view the latest release of "What's New in Cisco Documentation" at this URL:

  http://www.cisco.com/univercd/cc/td/doc/abtunicd/136957.htm

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

CHAPTER 1

Upgrading to a Multishelf System

This chapter describes how to upgrade a single-chassis Cisco CRS-1 Carrier Routing System router to a Cisco CRS-1 Carrier Routing System Multishelf System.

Note For an introduction to the multishelf system, see *Cisco CRS-1 Carrier Routing System Multishelf System Description*. For information on planning a multishelf system installation, see *Cisco CRS-1 Carrier Routing System Multishelf System Site Planning Guide*.

Feature History for the Cisco CRS-1 Multishelf System

Release	Modification
Release 3.3.0	The Cisco CRS-1 Multishelf System was introduced.
Release 3.4.0	No modification.

Contents

This chapter contains the following sections:

Prerequisites for Upgrading to a Multishelf System

An upgrade kit is required to use an existing Cisco CRS-1 16-Slot Line Card Chassis as a component in a multishelf system. The upgrade kit is product ID CRS-16-MC-UPG. The upgrade kit includes fabric cards (S13 cards should replace the S123 cards) and cabling.

- Prepare the single chassis system as follows:
  - Obtain the chassis serial number, which is required for configuration. The serial number is on a chassis label and can be displayed using the **show diag chassis**, as described in *Cisco IOS XR Getting Started Guide.*
  - Upgrade the ROM Monitor software to Version 1.42 or later, as described in *Cisco IOS XR ROM Monitor Guide*.
  - For more information, see the documents in the "Related Cisco CRS-1 Multishelf Hardware Documentation" section on page 1-17.
- Prepare each fabric card chassis (FCC) as follows:
  - Install the FCCs and distribute the eight fabric card chassis-switch fabric cards (FCC-SFCs, product ID CRS-FCC-SFC) among the FCCs.
  - Obtain the chassis serial number for each FCC, which is required for configuration. The serial number is on a chassis label and can be displayed using the **show diag chassis**, as described in *Cisco IOS XR Getting Started Guide.*
  - Ensure that the power to the FCCs is off.
  - Connect all fabric cables to the FCCs, as described in *Cisco CRS-1 Carrier Routing System Multishelf System Interconnection and Cabling Guide*.
  - For more information, see the documents in the "Related Cisco CRS-1 Multishelf Hardware Documentation" section on page 1-17.

Note You cannot connect the fabric cables to the pre-existing single-chassis rack until you replace the FC/S cards in the line card chassis (LCC). To avoid service interruption, replace these modules and connect the fabric cables only when instructed to do so in the procedure that appears in the "How to Upgrade to a Multishelf System" section on page 1-3.

- Prepare the additional LCC as follows:
  - Install the LCC and all cards.
  - Obtain the chassis serial number, which is required for configuration.
  - Ensure that the power to the LCC is off.
  - For more information, see the documents in the "Related Cisco CRS-1 Multishelf Hardware Documentation" section on page 1-17.
- Prepare the control network (Catalyst 6509 switches) as follows:
  - Install the Catalyst 6509 switches.
  - Cable the Catalyst 6509 switches to the FCC and both LCCs, as described in *Cisco CRS-1 Carrier Routing System Multishelf System Interconnection and Cabling Guide*.
  - Configure the Catalyst 6509 switches, as described in *Cisco IOS XR Getting Started Guide*.
  - For more information, see the documents in the "Related Documentation for the Catalyst 6509 Switch" section on page 1-18.

Restrictions for Upgrading to a Multishelf System

Cisco IOS XR Software Release supports the multishelf feature only on the 16-slot LCCs. This release does not support multishelf operation using 8-slot LCCs.

Information About Upgrading to a Multishelf System

The difference between upgrading a single-chassis system to a multishelf system and installing a multishelf system is the fabric upgrade. A single-chassis system uses fabric cards designed for single-chassis systems (FC/S cards), and an LCC in a multishelf system uses fabric cards designed for a multishelf system (FC/M cards). On a single chassis system, each fabric card represents one fabric plane. To upgrade a single-chassis system to a multishelf system without interrupting service, you must do the following:

1. Use CLI commands to prepare each FC/S fabric card for replacement with an FC/M card.
2. Shut down the plane on each FC/S card before it is replaced.
3. Replace the FC/S card with an FC/M card.
4. Bring up the FC/M card.
5. Repeat Step 2 through Step 4 until all planes (0 through 7) are upgraded.

When you plan to perform a single-shelf to multishelf system upgrade, consider the following:

- You need these components:
  - Fabric card chassis and new line card chassis.
  - Cisco Catalyst 6509 Switch, which provides the control Ethernet network for the multishelf system control traffic. We highly recommend two switches for redundancy.
  - S13 cards for the original line card chassis (to replace the original S123 cards in the chassis).
  - Optical array cables (48 cables for each multishelf system and 24 cables for each line card chassis).
  - Additional MSCs and PLIMs for the new line card chassis.
- To avoid traffic loss, you must upgrade the switch fabric one plane at a time. To do that, you must replace each FC/S card with a new FC/M card and restore service to that fabric plane before upgrading the next fabric plane.
- You might want to perform the upgrade during a network maintenance window or when system traffic is light.

Note Be sure to review the upgrade procedures before deciding when to schedule the upgrade. That way, you can familiarize yourself with the upgrade procedure and determine if there are other issues to consider before performing the upgrade.

- Are there cabling issues to consider when you add the new chassis to the existing chassis? For example, will you have to install optical chassis interconnect cables between the chassis before you bolt the chassis to the floor? If so, be sure to protect the cables while moving the chassis.

How to Upgrade to a Multishelf System

To upgrade a single-chassis system to a multishelf system, you must complete the following tasks:

- Upgrading the Fabric Cards and Adding an FCC, page 1-4
- Adding an LCC to a Multishelf System, page 1-9

Upgrading the Fabric Cards and Adding an FCC

This section describes how to upgrade the fabric cards in a single-chassis system and establish communications between the designated shelf controller (DSC) LCC and one or more FCCs.

Prerequisites

Software Requirements

- Cisco IOS XR Software Release 3.4.0 or later
- ROMMON 1.42 or later

Caution The ROM Monitor software must be upgraded to version 1.42 or higher on all RPs before a Cisco CRS-1 system is upgraded to Cisco IOS XR Software Release 3.4.0 or higher release. If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot. For instructions to overcome a boot block in the standby RP in a single chassis system, see *Cisco IOS XR ROM Monitor Guide*. If a boot block occurs in a multishelf system, contact your Cisco Systems support representative for assistance. See Obtaining Technical Assistance, page viii.

In addition, Cisco CRS-1 Multishelf systems should be upgraded to ROMMON release 1.42 before being upgraded to IOS XR Release 3.4.0 to ensure RPs are assigned the correct rack numbers during system boot.

For more information, see *Cisco IOS XR ROM Monitor Guide*.

Hardware Requirements

- The system hardware should be prepared as described in the "Prerequisites for Upgrading to a Multishelf System" section on page 1-1.
- The control network must be set up as described in the "Prerequisites for Upgrading to a Multishelf System" section on page 1-1.
- The power should be off for the FCCs and any additional LCCs.

Restrictions

None.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **dsc serial** *serialNumber* **rack 0**
4. **dsc serial** *serialNumber* **rack F***rack*
5. **controllers fabric plane** *planeNumber*
   oim count 1
   oim instance 0 location F*rack*/*slot*/**FM**
6. **commit**
7. **end**

8. Apply power to the FCC.
9. **show platform F***rack***/**/***
10. **configure**
11. **do show controllers fabric plane all**
12. **controllers fabric plane** *planeNumber* **shutdown**
13. **commit**
14. **end**
15. In Rack 0, remove the FC/S card for the plane that was shut down in Step 12.
16. In Rack 0, insert the FC/M card for the plane that was shut down in Step 12.
17. **show platform 0/sm***slotNumber***/sp**
18. In Rack 0, attach the fabric cable connectors to the plane that was shut down in Step 12.
19. In the appropriate FCC, check the LEDs on the appropriate OIM-LED panel for the cables connected to the plane that is being upgraded.
20. **configure**
21. **do show controllers fabric plane** *planeNumber* **detail**
22. **no controllers fabric plane** *planeNumber* **shutdown**
23. **commit**
24. **end**
25. Repeat Step 9 through Step 24 for each fabric plane.
26. **show controllers fabric plane all**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** `RP/0/RP1/CPU0:router# admin`	Places the router in administration EXEC mode. • All commands listed in this procedure should be entered on the pre-existing single-chassis system.
Step 2	**configure** **Example:** `RP/0/RP1/CPU0:router(admin)#configure`	Places the router in administration configuration mode.
Step 3	**dsc serial** *serialNumber* **rack 0** **Example:** `RP/0/RP1/CPU0:router(admin-config)# dsc serial TBA08260159 rack 0`	Configures the pre-existing single-chassis system as the DSC rack in the new multishelf system. • Replace *serialNumber* with the serial number of the pre-existing single-chassis system. • If you are configuring the system from a remote location, you can use a command to display the serial number. For more information, see *Cisco IOS XR Getting Started Guide*.

	Command or Action	Purpose
Step 4	**dsc serial** *serialNumber* **rack F***rack* **Example:** `RP/0/RP1/CPU0:router(admin-config)# dsc serial TBC0820052000000 rack F0`	Configures the FCC identified by the serial number as an FCC rack within the multishelf system. • Replace *serialNumber* with the serial number of the FCC. • Replace *rack* with the FCC number as it appears in the fabric cabling plan, which is described in *Cisco CRS-1 Carrier Routing System Multishelf System Interconnection and Cabling Guide.* • If you are configuring the system from a remote location, you can use a command to display the serial number. For more information, see *Cisco IOS XR Getting Started Guide.*

Step 5	**controllers fabric plane** *planeNumber*
	oim count 1
	oim instance 0 location F*rack*/*slot*/**FM**
	
	Example:
	`RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 0`
	`RP/0/RP1/CPU0:router(admin-config)# oim count 1`
	`RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM9/FM`
		Configures a plane to operate in an FCC slot.
		• Enter this command sequence for each of the eight fabric planes.
		• Replace *planeNumber* with the number of the plane (0 to 7) you want to configure.
		• Replace *rack* with the FCC rack number assigned to the FCC that hosts the plane.
		• Replace *slot* with the FCC slot number that supports the fabric plane you are configuring. Valid slot numbers are SM0 to SM23.
		• The plane numbers and slot numbers are determined by the hardware installation and cabling. The software configuration must match the hardware configuration. For more information, see *Cisco CRS-1 Carrier Routing System Multishelf System Interconnection and Cabling Guide*.
		• Enter this command once for each of the eight planes.
		Note These configuration commands are ignored when the FC/S cards are installed.

Step 6	**commit** **Example:** `RP/0/RP1/CPU0:router(admin-config)# commit`	Commits the target configuration to the router running configuration.
Step 7	**end** **Example:** `RP/0/RP1/CPU0:router(admin-config)# end`	Changes the mode from administration configuration mode to administration EXEC mode.
Step 8	Apply power to the FCCs.	Starts the FCCs.

	Command or Action	Purpose
Step 9	**show platform F***rack*/**/*** **Example:** `RP/0/RP1/CPU0:router(admin)# show platform F0/**/*`	Displays the status of all FCC modules in the specified rack. • Replace *rack* with the rack number of the FCC to examine. • Repeat this command for all FCCs. • The state for all modules should be IOS-XR RUN. • It can take a few minutes for all FCC modules to start. **Note** The FCC module status appears only when the **show platform** command is executed in administration EXEC mode.
Step 10	**configure** **Example:** `RP/0/RP1/CPU0:router(admin)#configure`	Places the router in administration configuration mode.
Step 11	**do show controllers fabric plane all** **Example:** `RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric plane all`	Displays the administrative and operational status of all eight fabric planes. • The **do** command prefix allows the EXEC mode **show** command to execute in administration configuration mode. **Caution** To prevent service interruption, do not continue until the administrative and operational status for all eight planes is UP.
Step 12	**controllers fabric plane** *planeNumber* **shutdown** **Example:** `RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 0 shutdown`	Modifies the target configuration to shut down the specified plane number. • Replace the *planeNumber* parameter with the number of the plane you want to shut down.
Step 13	**commit** **Example:** `RP/0/RP1/CPU0:router(admin-config)# commit`	Commits the target configuration to the router running configuration. • This step shuts down the plane identified in the previous step.
Step 14	**end** **Example:** `RP/0/RP1/CPU0:router(admin-config)# end`	Changes the mode from administration configuration mode to administration EXEC mode.
Step 15	In Rack 0, remove the FC/S card for the plane that was shut down in Step Step 12.	Creates room for the FC/M card that is required for multishelf operation.
Step 16	In Rack 0, insert the FC/M card for the plane that was shut down in Step Step 12.	Provides the hardware required for communication with the FCC.

	Command or Action	Purpose
Step 17	**show platform 0/sm***slotNumber***/sp** **Example:** `RP/0/RP1/CPU0:router(admin)# show platform 0/sm0/sp`	Displays the status of the Rack 0 fabric slot specified by *slotNumber*. **Note** The fabric card status appears only when the **show platform** command is executed in administration EXEC mode.
Step 18	In Rack 0, attach the fabric cable connectors to the plane that was shut down in Step Step 12.	Completes the connection between a plane in the LCC and the same plane in the FCC.
Step 19	In the appropriate FCC, check the LEDs on the appropriate OIM-LED panel for the cables connected to the plane that is being upgraded.	Green LEDs indicate that the cables are connected correctly. • If the LEDs display a color other than green, see *Cisco IOS XR Getting Started Guide* for information on interpreting the LED display.
Step 20	**configure** **Example:** `RP/0/RP1/CPU0:router(admin)#configure`	Places the router in administration configuration mode.
Step 21	**do show controllers fabric plane** *planeNumber* **detail** **Example:** `RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric plane 0 detail`	Displays the status of the plane specified by *planeNumber*. • Verify that a capital “P” appears in the Down Flags column. • Wait for the plane to come up before you continue.
Step 22	**no controllers fabric plane** *planeNumber* **shutdown** **Example:** `RP/0/RP1/CPU0:router(admin-config)# no controllers fabric plane 0 shutdown`	Modifies the target configuration to bring up the specified fabric plane.
Step 23	**commit** **Example:** `RP/0/RP1/CPU0:router(admin-config)# commit`	Commits the target configuration to the router running configuration. • This step brings up the previously shutdown plane, which is now configured to use the FCC-SFC.
Step 24	**end** **Example:** `RP/0/RP1/CPU0:router(admin-config)# end`	Changes the mode from administration configuration mode to administration EXEC mode.
Step 25	Repeat Step 9 through Step 24 for each fabric plane.	
Step 26	**show controllers fabric plane all** **Example:** `RP/0/RP1/CPU0:router(admin)# show controllers fabric plane all`	Displays the administrative and operational status of all eight fabric planes. • Verify that all fabric planes are operational.

What to Do Next

When the Rack 0 upgrade is completed and Rack 0 is communicating with FCCs, the next step is to add a second LCC to the multishelf system.

Adding an LCC to a Multishelf System

This section describes how to add an LCC to a multishelf system.

Prerequisites

Software Requirements

- Cisco IOS XR Software Release 3.4.0 or later
- ROMMON 1.42 or later

Hardware Requirements

- The LCC to be added must be prepared as described in the "Prerequisites for Upgrading to a Multishelf System" section on page 1-1.
- The control network must be operational and connected to all chassis.
- The power should be off for the LCC to be added.

Restrictions

None.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **dsc serial** *serialNumber* **rack 1**
4. **controllers fabric rack 1 install-mode**
5. **commit**
6. Apply power to the new LCC (Rack 1).
7. Connect all fabric cables that connect the fabric planes in the new LCC to the FCCs.
8. In the FCCs, check the LEDs for the cables that connect to the new LCC (Rack 1).
9. **do show controllers fabric rack-status all detail**
10. **do show controllers fabric fabric-backpressure summary**
11. **no controllers fabric rack 1 install-mode**
12. **commit**
13. **do show controllers rack-status all detail**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** `RP/0/RP1/CPU0:router# admin`	Places the router in administration EXEC mode. • All commands listed in this procedure should be entered on the pre-existing single-chassis system.
Step 2	**configure** **Example:** `RP/0/RP1/CPU0:router(admin)#configure`	Places the router in administration configuration mode.
Step 3	**dsc serial** *serialNumber* **rack 1** **Example:** `RP/0/RP1/CPU0:router(admin-config)# dsc serial TBA08440024 rack 1`	Configures the additional LCC as Rack 1 in the multishelf system. • Replace the *serialNumber* parameter with the serial number of the additional LCC. • If you are configuring the system from a remote location, you can use a command to display the serial number. For more information, see *Cisco IOS XR Getting Started Guide.*
Step 4	**controllers fabric rack 1 install-mode** **Example:** `RP/0/RP1/CPU0:router(admin-config)# controllers fabric rack 1 install-mode`	Modifies the target configuration to change the Rack 1 configuration to installation mode.
Step 5	**commit** **Example:** `RP/0/RP1/CPU0:router(admin-config)# commit`	Commits the target configuration to the router running configuration.
Step 6	Apply power to the new LCC (Rack 1).	Starts up the second LCC (Rack 1).
Step 7	Connect all fabric cables that connect the fabric planes in the new LCC to the FCCs.	Interconnects the fabric cards in the LCC and FCC.
Step 8	In the FCCs, check the LEDs for the cables that connect to the new LCC (Rack 1).	Green LEDs indicate that the cables are connected correctly. • If the LEDs display a color other than green, see *Cisco IOS XR Getting Started Guide* for information on interpreting the LED display.
Step 9	**do show controllers fabric rack-status all detail** **Example:** `RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric rack-status all detail`	Displays the status of all racks and additional information for racks in installation mode. • Wait for the status in the Rack in Install and Rack out of Install columns to change to UP for all planes.

	Command or Action	Purpose
Step 10	**do show controllers fabric fabric-backpressure summary** **Example:** `RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric fabric-backpressure summary`	Displays the backpressure status for all racks. • The status for the row labeled "Rack 1: All Groups Received? :" should be "Yes."
Step 11	**no controllers fabric rack 1 install-mode** **Example:** `RP/0/RP1/CPU0:router(admin-config)# no controllers fabric rack 1 install-mode`	Modifies the target configuration to change the Rack 1 configuration to normal mode.
Step 12	**commit** **Example:** `RP/0/RP1/CPU0:router(admin-config)# commit`	Commits the target configuration to the router running configuration.
Step 13	**do show controllers rack-status all detail** **Example:** `RP/0/RP1/CPU0:router(admin-config)# do show controllers rack-status all detail`	Displays the status of all racks in the system. • In a properly operating system, the rack status for all racks should be Normal, and the server status should be Present.

What to Do Next

When all chassis in the multishelf system are operational and communicating with each other, it is time to continue system configuration, as described in the documents in the "Related Documents" section on page 1-17.

Troubleshooting Tips

For troubleshooting information, see the documents described in the "Related Documents" section on page 1-17.

Configuration Examples for Upgrading to a Multishelf System

This section provides examples for the following procedures:

Displaying Chassis Serial Numbers: Example

The following example shows how to display the chassis serial numbers in a Cisco CRS-1 Multishelf system.

```
RP/0/RP0/CPU0:router(admin)# show diag chassis
```

```
RACK   0 :
  MAIN:  board type 0001e0
         800-24872-01 rev 20
         dev N/A
         S/N TBA08260159
  PCA:   73-7640-05 rev 20
  PID:   CRS-16-LCC
  VID:   V01
  CLEI:  IPM6700DRA
  ECI:   445022
  RACK NUM: 0

RACK   1 :

  MAIN:  board type 0001e0
         800-24872-01 rev 20

         dev N/A
         S/N TBA08260159
  PCA:   73-7640-05 rev 20
  PID:   CRS-16-LCC
  VID:   V01
  CLEI:  IPM6700DRA
  ECI:   445022
  RACK NUM: 0

RACK 240 :
  MAIN:  board type 0001e0
         800-24872-01 rev 20
         dev N/A
         S/N TBA08260159
  PCA:   73-7640-05 rev 20
  PID:   CRS-16-LCC
  VID:   V01
  CLEI:  IPM6700DRA
  ECI:   445022
  RACK NUM: 0
```

Adding a Fabric Card Chassis: Example

The following example shows how to add a single FCC to an existing single-chassis system.

```
RP/0/RP1/CPU0:router# admin

RP/0/RP1/CPU0:router(admin)# configure

RP/0/RP1/CPU0:router(admin-config)# dsc serial TBC0820052000001 rack 0

RP/0/RP1/CPU0:router(admin-config)# dsc serial TBC0820052000000 rack F0

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 0
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM9/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 1
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM6/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 2
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM3/FM
```

```
RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 3
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM0/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 4
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM12/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 5
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM15/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 6
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM18/FM

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 7
RP/0/RP1/CPU0:router(admin-config)# oim count 1
RP/0/RP1/CPU0:router(admin-config)# oim instance 0 location F0/SM21/FM

RP/0/RP1/CPU0:router(admin-config)# commit

RP/0/RP1/CPU0:router(admin-config)# end
```

Power is applied to the FCC at this time.

```
RP/0/RP1/CPU0:router(admin)# show platform F0/**/*

Node            Type            PLIM            State           Config State
-------------------------------------------------------------------------------
F0/SM0/SP       FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM3/SP       FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM6/SP       FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM9/SP       FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM12/SP      FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM15/SP      FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM18/SP      FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SM21/SP      FCC-SFC(SP)     FCC-FM-1S       IOS XR RUN      PWR,NSHUT,MON
F0/SC0/CPU0     FCC-SC(Standby) N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SC1/CPU0     FCC-SC(Active)  N/A             IOS XR RUN      PWR,NSHUT,MON
F0/AM0/SP       ALARM(SP)       N/A             IOS XR RUN      PWR,NSHUT,MON
F0/AM1/SP       ALARM(SP)       N/A             IOS XR RUN      PWR,NSHUT,MON
F0/LM0/SP       FCC-LED(SP)     N/A             IOS XR RUN      PWR,NSHUT,MON
F0/LM1/SP       FCC-LED(SP)     N/A             IOS XR RUN      PWR,NSHUT,MON

RP/0/RP1/CPU0:router(admin)# configure

RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric plane all

  Flags: P - plane admin down,       p - plane oper down
         C - card admin down,        c - card  oper down
         L - link port admin down,   l - linkport oper down
         A - asic admin down,        a - asic oper down
         B - bundle port admin Down, b - bundle port oper down
         I - bundle admin down,      i - bundle oper down
         N - node admin down,        n - node down
         o - other end of link down  d - data down
         f - failed component downstream
         m - plane multicast down

 Plane  Admin   Oper
 Id     State   State
 --------------------
```

```
 0       UP      UP
 1       UP      UP
 2       UP      UP
 3       UP      UP
 4       UP      UP
 5       UP      UP
 6       UP      UP
 7       UP      UP

RP/0/RP1/CPU0:router(admin-config)# controllers fabric plane 0 shutdown

RP/0/RP1/CPU0:router(admin-config)# commit

RP/0/RP1/CPU0:router(admin-config)# end

RP/0/RP1/CPU0:Mar  4 18:37:55.055 : fsdb_aserver[173]: %FABRIC-FSDB-1-PLANE_UPDOWN : Plane
0 state changed to DOWN:
RP/0/RP1/CPU0:Mar  4 18:37:55.088 : config[65733]: %MGBL-LIBTARCFG-6-ADMIN_COMMIT :
Administration configuration committed by user 'user_a'.
```

The FC/S card is replaced with an FC/M card at this point.

```
RP/0/RP1/CPU0:Mar  4 18:38:32.680 : oir_daemon[245]: %PLATFORM-OIRD-5-OIROUT : OIR: Node
0/SM0/SP removed
RP/0/RP1/CPU0:Mar  4 18:38:54.328 : oir_daemon[245]: %PLATFORM-OIRD-5-OIRIN : OIR: Node
0/SM0/SP inserted
SP/0/SM0/SP:Mar  4 18:40:52.575 : alphadisplay[100]: %PLATFORM-ALPHA_DISPLAY-6-CHANGE :
Alpha display on node 0/SM0/SP changed to IOS-XR   in state default
SP/0/SM0/SP:Mar  4 18:41:34.027 : sfe_drvr[108]: %FABRIC-FABRIC_DRVR-6-ASIC_INITIALIZED :
Fabric ASICs initialized

RP/0/RP1/CPU0:router(admin)# show platform 0/sm9/sp

0/SM9/SP       FC/M(SP)     N/A          IOS-XR RUN      PWR,NSHUT,MON
```

The fabric cable is attached to the FC/M card at this point.

```
RP/0/RP1/CPU0:router(admin)# configure

RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric plane 0 detail
...
 Plane  Admin   Oper       Down       Total     Down
 Id     State   State      Flags      Bundles   Bundles
 ------------------------------------------------------
 0      DOWN    DOWN       pPm        9         6

RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric plane 0 detail
...
 Plane  Admin   Oper       Down       Total     Down
 Id     State   State      Flags      Bundles   Bundles
 ------------------------------------------------------
 0      DOWN    DOWN        P          9         6

RP/0/RP1/CPU0:iox(admin-config)# no controllers fabric plane 0 shutdown

RP/0/RP1/CPU0:iox(admin-config)# commit

RP/0/RP1/CPU0:Mar  4 18:47:42.930 : fsdb_aserver[173]: %FABRIC-FSDB-1-PLANE_UPDOWN : Plane
0 state changed to UP:
RP/0/RP1/CPU0:Mar  4 18:47:42.954 : config[65733]: %MGBL-LIBTARCFG-6-ADMIN_COMMIT :
Administration configuration committed by user 'user_a'.
```

```
RP/0/RP1/CPU0:router(admin-config)# end

RP/0/RP1/CPU0:router(admin)# show controllers fabric plane all

  Flags: P - plane admin down,       p - plane oper down
         C - card admin down,        c - card  oper down
         L - link port admin down,   l - linkport oper down
         A - asic admin down,        a - asic oper down
         B - bundle port admin Down, b - bundle port oper down
         I - bundle admin down,      i - bundle oper down
         N - node admin down,        n - node down
         o - other end of link down  d - data down
         f - failed component downstream
         m - plane multicast down

 Plane  Admin   Oper
 Id     State   State
 --------------------
 0      UP      UP
 1      UP      UP
 2      UP      UP
 3      UP      UP
 4      UP      UP
 5      UP      UP
 6      UP      UP
 7      UP      UP
```

Adding an LCC to a Multishelf System: Example

The following example shows how to add an LCC to a multishelf system.

```
RP/0/RP1/CPU0:router# admin

RP/0/RP1/CPU0:router(admin)# configure

RP/0/RP1/CPU0:router(admin-config)# dsc serial TBC0820031000000 rack 1

RP/0/RP1/CPU0:router(admin-config)# control fabric rack 1 install-mode

RP/0/RP1/CPU0:router(admin-config)# commit
```

Apply power, attach cables, and check cable LEDs.

```
RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric rack-status all detail

Rack   Rack       Server
Num    Status     Status
----   ------     ------

 0       NORMAL    PRESENT
 1      INSTALL    PRESENT                          Oper State
                                                  ----------------------
                                Plane  Admin  Rack in     Rack out
                                Num    State  Install     of Install
                                -----  -----  -------     ----------
                                0      UP     UP          UP
                                1      UP     UP          DOWN
                                2      UP     UP          DOWN
                                3      UP     UP          DOWN
                                4      UP     UP          DOWN
```

```
                                5       UP      UP          DOWN
                                6       UP      UP          DOWN
                                7       UP      UP          DOWN

 F0      NORMAL    PRESENT

RP/0/RP1/CPU0:router(admin-config)# do show controllers fabric rack-status all detail

Rack   Rack       Server
Num    Status     Status
----   ------     ------

 0       NORMAL    PRESENT
 1      INSTALL    PRESENT                          Oper State
                                                   ----------------------
                                Plane  Admin  Rack in     Rack out
                                Num    State  Install     of Install
                                -----  -----  -------     ----------
                                0      UP     UP          UP
                                1      UP     UP          UP
                                2      UP     UP          UP
                                3      UP     UP          UP
                                4      UP     UP          UP
                                5      UP     UP          UP
                                6      UP     UP          UP
                                7      UP     UP          UP

 F0      NORMAL    PRESENT

RP/0/RP1/CPU0:router(admin-config)# show controllers fabric fabric-backpressure summary

  Expected BP Fabric Groups in the System:  0  1  2  3

  Rack 0:   All Groups Received? :  Yes
  ------

  Rack 1:   All Groups Received? :  Yes

RP/0/RP1/CPU0:router(admin-config)# no controllers fabric rack 1 install-mode

RP/0/RP1/CPU0:router(admin-config)# commit

RP/0/RP1/CPU0:router(admin-config)# do show controllers rack-status all detail

Rack   Rack       Server
Num    Status     Status
----   ------     ------

 0       NORMAL    PRESENT
 1       NORMAL    PRESENT
 F0      NORMAL    PRESENT
```

Where to Go Next

When all fabric planes on both LCCs are configured and connected to the FCCs, see *Cisco IOS XR Getting Started Guide* for information on general system setup and operation.

Additional References

The following sections provide references related to upgrading a single-chassis system to a multishelf system.

Related Documents

Related Cisco CRS-1 Multishelf Hardware Documentation

For additional documentation related to hardware installation and site planning, see the following Cisco Systems documents:

Related Topic	Document Title
Multishelf system description and installation planning	*Cisco CRS-1 Carrier Routing System Multishelf System Description* *Cisco CRS-1 Carrier Routing System Multishelf System Planning Guide*
FCC installation	*Cisco CRS-1 Carrier Routing System Fabric Card Chassis Site Planning Guide* *Installing the Cisco CRS-1 Carrier Routing System Fabric Card Chassis*
LCC installation	*Cisco CRS-1 Carrier Routing System 16-Slot Line Card Chassis System Description* *Installing the Cisco CRS-1 Carrier Routing System 16-Slot Line Card Chassis*
Cabling between all system components	*Cisco CRS-1 Carrier Routing System Multishelf System Interconnection and Cabling Guide.*
Color codes for FCC OIM-LED panel LEDs	*Cisco CRS-1 Carrier Routing System Multishelf System Description*
Troubleshooting	*Cisco CRS-1 Carrier Routing System Multishelf System Troubleshooting Guide*

Related Documentation for the Catalyst 6509 Switch

For additional documentation related to the installation and configuration of the Catalyst 6509 switch, see the following Cisco Systems documents:

Related Topic	Document Title
Catalyst 6509 installation	Cisco Catalyst 6500 Series documentation
Catalyst 6509 configuration and general system configuration after the fabric installation and configuration is complete	*Cisco IOS XR Getting Started Guide*

Related Cisco IOS XR Software Documentation

The Cisco IOS XR software documentation is published at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/ioxsoft/index.htm

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

CHAPTER 2

Converting to an Integrated Switch System

This chapter describes the following concepts:

- Convert to a Cisco CRS-1 Multishelf System that uses an external Cisco Catalyst 6509 Switches, to a system that uses integrated switches that are located on the 22-port shelf controller Gigabit Ethernet (22-port SCGE) card.
- Remove the Cisco Catalyst switches and replace them with 22-port SCGE cards.
- Remove and replace techniques are used to complete the process.

Feature History for the Cisco CRS-1 Multishelf System

Release	Modification
Release 3.4.1	The 22-port shelf controller Gigabit Ethernet (22-port SCGE) card is introduced.

Contents

This chapter contains the following sections:

Prerequisites for the Integrated Switch System

Hardware Requirements

- Ensure that all fabric card chassis (FCCs) have two power shelves and that all three power entry modules (PEMs) in each power shelf are running correctly. During the conversion, when one 22-port SCGE is removed, the chassis must have both power shelves populated to keep all the fans in the chassis engaged.
- Two 22-port SCGE per fabric chassis.
- Four 22-port SCGE for a Two-FCC Multishelf System.
- Eight 22-port SCGE for a Four-FCC Multishelf System.

Software Requirements

- Cisco IOS XR Software Release 3.4.1 to support 22-port SCGE.
- ROMMON version 1.43 or higher

Caution Before performing the procedures that are described in this chapter, it is important to wait until the previous step is completed before attempting the next step. Failure to do so can result in a failure of the migration procedure. If a previous step fails to complete successfully, contact Cisco Technical Support before proceeding. We do not have a rollover procedure defined.

Cisco CRS-1 Multishelf Conversion to an Integrated Switch System Introduction

The first implementation of the Cisco CRS-1 Multishelf System, the interrack control network was established by connecting the GE ports on each LCCs route processor (RP) to two external Cisco Catalyst 65*xx* switches, which, in turn, were connected to the FCCs' shelf controller (SC) cards. Two Cisco Catalyst 65*xx* switches were used to achieve redundancy, and Rapid Spanning Tree Protocol (RSTP) was used to ensure a loop-free topology.

In the first release of the Cisco CRS-1 Multishelf System (running Cisco IOS XR Software Release 3.2.50), two Cisco Catalyst 65*xx* switches are interconnected to the multishelf's fabric card chassis (FCC0, FCC1, FCC2, and FCC3) and two line card chassis (LCC0 and LCC1) to form the interchassis control network.

The 22-port SCGE card replaces the current 2-port SCGE card in the multishelf system (MSS) FCC. The 22-port SCGE card contains built-in bundled Gigabit Ethernet (GE) switches. The 22-port SCGE card is designed to integrate the functionality of the two Cisco Catalyst 65*xx* switches. With the new 22-port SCGE card, all Layer 2 system switching is now bundled and integrated into the Cisco CRS-1 router. On the 22-port SCGE card, there are 22 ports available on the front panel. Each port on the 22-port SCGE card has two LEDs, which indicate port activity and link state.

When the 22-port SCGE cards are installed, the control network topology ceases to be a simple hub-and-spoke set of connections.

Cisco CRS-1 Multishelf Integrated Switch Solution

When the Cisco Catalyst 65*xx* switches are phased out of the multishelf network, the new 22-port SCGE cards, which are installed in the Cisco CRS-1 Multishelf FCCs, are connected directly to the Cisco CRS-1 Multishelf LCC RPs. The Cisco CRS-1 RP is a system controller that performs route processing and distributes forwarding tables to the line cards. Although each routing system contains two RPs, only one RP is active at a time. The other RP operates in standby mode if the active RP fails.

To perform the conversion, you need to know how to view and use the STP on the Cisco Catalyst 65*xx* switch through the console port.

Note The Cisco Catalyst 65*xx* switches are typically configured so that one is the root of the spanning tree, and the other one is the backup root. All the ports in the root switch are in the forwarding state.

Before the conversion to the 22-port SCGE, if you have two ports from the RP connected to a Cisco Catalyst 65*xx* switch, you should see one RP port in forwarding state, and the other RP port in blocked state.

RSTP is used to break the interchassis loops in the Layer 2 control network.

Note Loops can happen only when a port is transitioning from a down state to an up state.

Benefits of the Cisco CRS-1 Multishelf Integrated Switch Solution

The following benefits are described for migrating from a Cisco Catalyst 65*xx* switch-based control network for the multishelf system to a bundled 22-port SCGE integrated switch solution:

- The Cisco Catalyst switches are configured with Cisco IOS software through a separate command-line interface (CLI). But the integrated 22-port SCGE switches are configured from the Cisco CRS-1 router console by using the Cisco IOS XR software, which is the same operating system used by the Cisco CRS-1 router. The control network is easier to connect and manage.
- There is no longer any need for two dedicated Catalyst switches per multichassis system.

Naming Conventions

The following naming conventions are used in this document:

- The fabric chassis upper cage shelf controller card and its slot are both referred to as SC0.
- The lower cage shelf controller card and slot are referred to as the SC1.
- There are two SC cards in every FCC for the purpose of redundancy.
- The active Cat6K remains active in the Cisco CRS-1 Multishelf control network.

How to Convert from the Cisco Catalyst 65xx Switch to the Integrated Switch System for Single-FCC Multishelf and Two-FCC Multishelf Systems

This section contains the following procedures:

Validating the 22-port SCGE Cards (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To validate the 22-port SCGE cards, perform the following steps:

Step 1 Insert the 22-port SCGE card into the standby slot (SC-GE-2) of FCC. Remove the 2-port card that is already installed.

Step 2 Use the **show platform** command in EXEC mode or administration EXEC mode to verify that the 22-port SCGE card is in the IOS XR RUN state, as shown in the following example:

```
RP/0/RP0/CPU0:router(admin)# show platform

Node            Type            PLIM            State           Config State
-------------------------------------------------------------------------------
0/3/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/3/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/3/2           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/3/4           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/RP0/CPU0      RP(Active)      N/A             IOS XR RUN      PWR,NSHUT,MON
0/RP1/CPU0      RP(Standby)     N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM1/SP        FC/M(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SM0/SP       FCC-SFC(SP)     N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SC0/CPU0     FCC-SC(Active)  N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SC1/CPU0     FCC-SC(Standby) N/A             IOS XR RUN      PWR,NSHUT,MON
```

Step 3 Use the **show redundancy** command in EXEC mode to verify that the standby node is ready.

```
RP/0/RP0/CPU0:router# show redundancy

Redundancy information for node 0/RP0/CPU0:
==========================================
Node 0/RP0/CPU0 is in ACTIVE role
```

```
Partner node (0/RP1/CPU0) is in STANDBY role
Standby node in 0/RP1/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Fri Feb  2 16:09:51 2007: 3 days, 1 hour, 46 minutes ago
Active node booted Fri Feb  2 16:09:51 2007: 3 days, 1 hour, 46 minutes ago
Standby node boot Fri Feb  2 16:13:40 2007: 3 days, 1 hour, 43 minutes ago
Standby node last went not ready Fri Feb  2 16:30:39 2007: 3 days, 1 hour, 26 minutes ago
Standby node last went ready Fri Feb  2 16:30:44 2007: 3 days, 1 hour, 26 minutes ago
There have been 0 switch-overs since reload

Redundancy information for node F0/SC0/CPU0:
==========================================
Node F0/SC0/CPU0 is in ACTIVE role
Partner node (F0/SC1/CPU0) is in STANDBY role
Standby node in F0/SC1/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Active node booted Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Standby node boot Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Standby node last went not ready Fri Feb  2 16:48:07 2007: 3 days, 1 hour, 8 minutes ago
Standby node last went ready Fri Feb  2 16:48:12 2007: 3 days, 1 hour, 8 minutes ago
There have been 0 switch-overs since reload
```

Step 4 Repeat Step 1 to Step 3 for the remaining FCC.

Connecting the 22-port SCGE to an Active Cat6K (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To connect the standby 22-port SCGE to an active Cat6K and connect the 22-port SCGEs to each other in a full mesh configuration, perform the following steps:

Step 1 Connect one port of the standby 22-port SCGE in each fabric chassis to the active Cat6K. Enable STP and portfast on these ports from the Cisco Catalyst 65*xx* switch side.

Step 2 Connect the two newly inserted standby 22-port SCGE cards to each other in a Two-FCC Multishelf System.

Step 3 Use the **show controller switch inter-rack stp** command in administration EXEC mode, with the **location** keyword, to verify that all the new connections and ports are working correctly.

Step 4 Verify that the connected ports are bidirectional and that the port neighbors are correct by using the **show controllers switch inter-rack udld** command, with the **all** and **location** keywords, in administration EXEC mode, as shown in the following syntax:

show controllers switch inter-rack udld {**all location** *node-id*}

Replace the *node-id* argument with the newly inserted standby 22-port SCGE card.

In addition, verify that the port is connected to an active Cat6K and is in the forwarding state (FWD) by using the **show controllers switch inter-rack stp** command, with the **ports** and **location** keywords, in administration EXEC mode, as shown in the following syntax:

show controller switch inter-rack stp {**ports** *interface number* **location** *node-id*}

Replace the *interface number* argument with the port that is connected to the active Cat6k.

Replace the *node-id* argument with the newly inserted standby 22-port SCGE card.

The following example sample output displays information for STP from the **show controllers switch inter-rack stp** command:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack stp ports 0 location

GE_0 of MST1 is designated forwarding
Edge port:             no        (default) port guard :    none     (default)
Link type: point-to-point           (auto) bpdu filter: disable     (default)
Boundary : internal                        bpdu guard : disable     (default)
Bpdus (MRecords) sent 204605, received 8

Instance Role Sts Cost      Prio.Nbr Vlans mapped
-------- ---- --- --------- -------- --------------------------------
        1 Desg  FWD    20000 128.   1 1
```

For the 22-port SCGE ports which are connected to each other, one is in the forwarding state and the other is in the blocked state.

Transferring the Backup Cisco Catalyst 65xx Switch Gigabit Ethernet Connections to a Standby 22-port SCGE (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To transfer the backup Cisco Catalyst 65*xx* switch GE connections to a standby 22-port SCGE card and to isolate the backup Cisco Catalyst 65*xx* switch from the control network, perform the following steps:

Step 1 Shut down the ports on the backup Cat6K one at a time. Make the interCat6K port the last port to shut down.

Step 2 Move the disabled GE connections between the active RPs (on both the LCC in case of a 2 FCC MC) and the backup Cat6K to the standby 22-port SCGE.

Step 3 Use the **show controllers switch stp** command, with the **location** keyword, in administration EXEC mode, to verify that the RP ports (GE1) that are connected to the 22-port SCGE are in the blocked state, and that the RP ports (GE0) that are connected to an active Cat6K are in the forwarding state, as shown in the following syntax:

show controllers switch inter-rack stp location *node-id*

Replace the *node-id* argument with the location of the 22-port SCGE card. In addition, you can use the newly inserted standby 22-port SCGE card.

Performing a Failover to a Standby 22-port SCGE (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To perform a failover to a standby 22-port SCGE and swap the remaining 2-ports SCGE in the system with the new 22-port SCGEs, perform the following steps:

Step 1 Perform a failover of the current active 2-ports SCGE card to the standby 22-port SCGE card. Use the **redundancy switchover** command, with the **location** keyword, in EXEC mode, as shown in the following syntax:

redundancy switchover location *node-id*

Replace the *node-id* argument with the location of the active 2-ports SCGE card.

Step 2 Verify that the failover is completed and that the 22-port SCGE card is now in active mode by using both the **show platform** command and **show redundancy** command.

The **show platform** command shows that the 22-port SCGE card is in IOS XR RUN state.

The **show redundancy** command shows that the 22-port SCGE card is in the active role.

Step 3 After the 22-port SCGE becomes active, swap the 2-ports SCGE card (now in standby mode) with a new 22-port SCGE card.

Note Do not attempt this step before Step 2 has completed.

Step 4 Use the **show platform** command in EXEC mode or administration EXEC mode to verify that the newly inserted 22-port SCGE card is in the IOS XR RUN state, as shown in the following example:

```
RP/0/RP0/CPU0:router(admin)# show platform

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/3/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/3/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/3/2           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/3/4           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/RP0/CPU0      RP(Active)      N/A             IOS XR RUN      PWR,NSHUT,MON
0/RP1/CPU0      RP(Standby)     N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM1/SP        FC/M(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SM0/SP       FCC-SFC(SP)     N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SC0/CPU0     FCC-SC(Active)  N/A             IOS XR RUN      PWR,NSHUT,MON
F0/SC1/CPU0     FCC-SC(Standby) N/A             IOS XR RUN      PWR,NSHUT,MON
```

Use the **show redundancy** command in EXEC mode to verify that the newly inserted 22-port SCGE cards are in standby ready, as shown in the following example:

```
RP/0/RP0/CPU0:router# show redundancy

Redundancy information for node 0/RP0/CPU0:
==========================================
Node 0/RP0/CPU0 is in ACTIVE role
Partner node (0/RP1/CPU0) is in STANDBY role
Standby node in 0/RP1/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Fri Feb  2 16:09:51 2007: 3 days, 1 hour, 46 minutes ago
Active node booted Fri Feb  2 16:09:51 2007: 3 days, 1 hour, 46 minutes ago
Standby node boot Fri Feb  2 16:13:40 2007: 3 days, 1 hour, 43 minutes ago
```

```
Standby node last went not ready Fri Feb  2 16:30:39 2007: 3 days, 1 hour, 26 minutes ago
Standby node last went ready Fri Feb  2 16:30:44 2007: 3 days, 1 hour, 26 minutes ago
There have been 0 switch-overs since reload

Redundancy information for node F0/SC0/CPU0:
==========================================
Node F0/SC0/CPU0 is in ACTIVE role
Partner node (F0/SC1/CPU0) is in STANDBY role
Standby node in F0/SC1/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Active node booted Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Standby node boot Fri Feb  2 16:13:39 2007: 3 days, 1 hour, 43 minutes ago
Standby node last went not ready Fri Feb  2 16:48:07 2007: 3 days, 1 hour, 8 minutes ago
Standby node last went ready Fri Feb  2 16:48:12 2007: 3 days, 1 hour, 8 minutes ago
There have been 0 switch-overs since reload
```

Step 5 Repeat Step 1 to Step 4 for the other fabric chassis on a two-FCC MC.

Connecting the 22-port SCGEs into a Full Mesh (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To connect the 22-port SCGEs in a full mesh configuration, perform the following steps:

Step 1 Connect each of the 22-port SCGE card to every other 22-port SCGE card in the system. For a one-FCC MC, this means one connection from the active 22-port SCGE card to the standby 22-port SCGE card. For a two-FCC MC, this means each 22-port SCGE card has three connections to the other three 22-port SCGE cards in the system. This constitutes a full mesh connectivity between the 22-port SCGE cards.

Step 2 Verify that all of the connected ports are bidirectional and that all of the neighbors are correct by using the **show controllers switch inter-rack udld** command, with the **all** and **location** keywords, in administration EXEC mode, as shown in the following syntax:

show controllers switch inter-rack udld {**all location** *node-id*}

Replace the *node-id* argument with the location for all of the 22-port SCGE card in the system.

Step 3 Verify that all of the connected ports to 22-port SCGE cards are displayed as either in forwarding (FWD) state or blocked (BLK) state for all of the 22-port SCGE cards in the system by using the **show controller switch inter-rack stp** command, with the **location** keyword, in administration EXEC mode.

The location is used for all of the 22-port SCGE cards in the system.

The following example shows location f0/sc0/cpu0:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack stp location f0/sc0/cpu0

##### MST   0 vlans mapped:   2-4094
Bridge        address 5246.48f0.20ff  priority      32768 (32768 sysid 0)
Root          this switch for the CIST
Operational   hello time  1, forward delay  6, max age  8, txholdcount  6
Configured    hello time  1, forward delay  6, max age  8, max hops     4

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
```

```
##### MST   1 vlans mapped:   1
Bridge        address 5246.48f0.20ff  priority      32769 (32768 sysid 1)
Root          this switch for MST1

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
           GE_13 Desg  FWD    20000 128.  14 P2p
           GE_14 Desg  FWD    20000 128.  15 P2p
           GE_15 Desg  FWD    20000 128.  16 P2p
           GE_17 Desg  FWD    20000 128.  18 P2p
           GE_22 Desg  FWD    20000 128.  23 P2p
```

Transferring an Active Cat6K Gigabit Ethernet Connections to the Active 22-port SCGE (Single-FCC Multishelf and Two-FCC Multishelf Systems)

To transfer the active Cat6K GE connections to the active 22-port SCGE and isolate the active Cat6K from the control network, perform the following steps:

Step 1 Disable the active Cat6K links that are connected to the active RP on the Designated Shelf Controller (DSC).

Step 2 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on the active RPs that the GE1 port, which is connected to the 22-port SCGE, goes into the forwarding (FWD) state.

The location is the location of the active RP.

Step 3 Shut down the ports on the active Cat6K one at a time, with the exception of the four links between an active Cat6K and the 22-port SCGE. Now, the active Cat6K remains connected to the fabric chassis with four GE links.

Step 4 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on all RPs that the GE1 port, which is connected to the 22-port SCGE, goes into the forwarding (FWD) state.

Step 5 Move the disabled GE link connecting the RPs and the active Cat6K link to the 22-port SCGE card.

Step 6 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on all RPs that the GE0 port, which is connected to the 22-port SCGE, goes into the blocked (BLK) state.

Step 7 Raise the priority of active Cat6K to 40960, which causes the root to change to 22-port SCGE on rack FCC0.

Step 8 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify that the active SC on FCC0 is the new root switch.

Step 9 Shut down the port that is connected to the active Cat6K on each of the 22-port SCGEs.

Step 10 Verify that there is no impact to the active topology and the control Ethernet traffic.

The migration is complete after you validate the new connections. You can remove the two Cisco Catalyst 65*xx* switches.

How to Convert from the Cisco Catalyst 65xx Switch to the Integrated Switch System for a Four-FCC Multishelf System

This section contains the following procedures:

Validating the 22-port SCGE Cards (Four-FCC Multishelf System)

To validate the 22-port SCGE cards, perform the following steps:

Step 1 Insert the 22-port SCGE card into the standby slot (SC-GE-2) of FCC. Remove the 2-port card that is already installed.

Step 2 Use the **show platform** command in EXEC mode or administration EXEC mode to verify that the 22-port SCGE card is in the IOS XR RUN state.

Step 3 Use the **show redundancy** command in EXEC mode to verify that the standby node is ready.

Step 4 Repeat Step 1 to Step 3 for all eight 22-port SCGE cards. Verify the two per fabric chassis by using the standby slot and leaving the second 22-port SCGE in the standby slot to continue with the upgrade.

Connecting the 22-port SCGE to an Active Cat6K (Four-FCC Multishelf System)

To connect the standby 22-port SCGE to an active Cat6K and connect the 22-port SCGEs to each other in a full mesh configuration, perform the following steps:

Step 1 Connect one port of the standby 22-port SCGE in each fabric chassis to the active Cat6K. Enable STP and portfast on these ports from the Cisco Catalyst 65*xx* switch side. If there are not enough ports on the active Cat6K, use the ports that were previously connected to the standby SCs in the four fabric chassis.

Step 2 Connect the ports to each other in a full mesh configuration for the 22-port SCGE.

Step 3 Use the **show controller switch inter-rack stp** command in administration EXEC mode, with the **location** keyword, to verify that all the new connections and ports are working correctly.

Step 4 Use the **show controllers switch inter-rack udld** command in administration EXEC mode, with the **all** and **location** keywords, to verify that all the ports for the 22-port SCGE are connected to the active Cat6K in the forwarding state.

The *node-id* argument is the location of the 22-port SCGE cards.

The following example displays sample output from the **show controllers switch inter-rack udld** command:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack udld all location
f0/sc0/CPU0

Interface Gig port# 0
---
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement - Single neighbor detected
Message interval: 7
Time out interval: 5

    Entry 1
    ---
    Expiration time: 16
    Device ID: 1
    Current neighbor state: Bidirectional
    Device name: 0_RP0_CPU0_Switch
    Port ID: GE_Port_0
    Neighbor echo 1 device: nodeF0_SC0_CPU0
    Neighbor echo 1 port: Gig port# 0

    Message interval: 7
    Time out interval: 5
    CDP Device name: BCM_SWITCH

Interface Gig port# 1
---
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement - Single neighbor detected
Message interval: 7
Time out interval: 5

    Entry 1
    ---
    Expiration time: 16
    Device ID: 1
    Current neighbor state: Bidirectional
    Device name: 0_RP1_CPU0_Switch
    Port ID: GE_Port_0
    Neighbor echo 1 device: nodeF0_SC0_CPU0
    Neighbor echo 1 port: Gig port# 1

    Message interval: 7
    Time out interval: 5
    CDP Device name: BCM_SWITCH

Interface Gig port# 2
---
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Unknown
Current operational state: Advertisement
Message interval: 7
Time out interval: 5
No neighbor cache information stored

Interface Gig port# 10
---
```

```
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement - Single neighbor detected
Message interval: 7
Time out interval: 5

    Entry 1
    ---
    Expiration time: 15
    Device ID: 1
    Current neighbor state: Bidirectional
    Device name: nodeF0_SC1_CPU0
    Port ID: Gig port# 10
    Neighbor echo 1 device: nodeF0_SC0_CPU0
    Neighbor echo 1 port: Gig port# 10

    Message interval: 7
    Time out interval: 5
    CDP Device name: BCM_SWITCH

Interface Gig port# 12
---
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Unknown
Current operational state: Advertisement
Message interval: 7
Time out interval: 5
No neighbor cache information stored

Interface Gig port# 22
---
Port enable administrative configuration setting: Enabled
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement - Single neighbor detected
Message interval: 7
Time out interval: 5

    Entry 1
    ---
    Expiration time: 19
    Device ID: 1
    Current neighbor state: Bidirectional
    Device name: F0_SC0_CPU0_Switch
    Port ID: GE_Port_0
    Neighbor echo 1 device: nodeF0_SC0_CPU0
    Neighbor echo 1 port: Gig port# 22

    Message interval: 7
    Time out interval: 5
    CDP Device name: BCM_SWITCH
```

In addition, verify that the port is connected to an active Cat6K and is in the forwarding (FWD) state by using the following syntax for the **show controllers switch inter-rack stp** command in administration EXEC mode:

show controllers switch inter-rack stp {**ports** *interface number* **location** *node-id*}

Replace the *interface number* argument with the port connected to the active Cat6K.

Replace the *node-id* argument with the newly inserted standby 22-port SCGE card.

The following example shows how to display information for the Spanning Tree Protocol (STP) from the **show controllers switch inter-rack stp** command:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack stp ports 0 location

GE_0 of MST1 is designated forwarding
Edge port:             no        (default) port guard :    none     (default)
Link type: point-to-point           (auto) bpdu filter: disable     (default)
Boundary : internal                        bpdu guard : disable     (default)
Bpdus (MRecords) sent 204605, received 8

Instance Role Sts Cost      Prio.Nbr Vlans mapped
-------- ---- --- --------- -------- --------------------------------
        1 Desg  FWD    20000 128.   1 1
```

For the 22-port SCGE ports which are connected to each other, one is in the forwarding state and the other is in the blocked state.

Step 5 Use the **show controller inter-rack stp** command in administration EXEC mode, with the **location** keyword, to verify the connection between the 22-port SCGE card. The active Cat6K goes into forwarding state.

The location is the location of the 22-port SCGE card.

The following example shows location f0/sc0/cpu0:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack stp location f0/sc0/cpu0

##### MST   0 vlans mapped:   2-4094
Bridge        address 5246.48f0.20ff  priority      32768 (32768 sysid 0)
Root          this switch for the CIST
Operational   hello time  1, forward delay  6, max age  8, txholdcount  6
Configured    hello time  1, forward delay  6, max age  8, max hops     4

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------

##### MST   1 vlans mapped:   1
Bridge        address 5246.48f0.20ff  priority      32769 (32768 sysid 1)
Root          this switch for MST1

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------
           GE_13 Desg  FWD    20000 128.  14 P2p
           GE_14 Desg  FWD    20000 128.  15 P2p
           GE_15 Desg  FWD    20000 128.  16 P2p
           GE_17 Desg  FWD    20000 128.  18 P2p
           GE_22 Desg  FWD    20000 128.  23 P2p
```

Transferring the Backup Cisco Catalyst 65xx Switch Gigabit Ethernet Connections to a Standby 22-port SCGE (Four-FCC Multishelf System)

To transfer the backup Cisco Catalyst 65*xx* switch GE connections to a standby 22-port SCGE and to isolate the backup Cisco Catalyst 65*xx* switch from the control network, perform the following steps:

Step 1 Shut down the ports on the backup Cat6K one at a time. Make the interCat6K port the last port to shut down.

Step 2 Move the disabled GE links between RPs and the backup Cat6K to the newly inserted 22-port SCGE cards. The following locations are listed:

- 0/rp0-GE1 to F1/SC1-GE0
- 0/rp1-GE1 to F3/SC1-GE0
- 1/rp0-GE1 to F0/SC1-GE0
- 1/rp1-GE1 to F2/SC1-GE0

Step 3 Use the **show controllers switch inter-rack udld** command in administration EXEC mode, with the **all** and **location** keywords, to verify that all of the new connections are bidirectional and have the correct neighbors.

The location is the location of the 22-port SCGE card.

Step 4 Use the **show controllers switch stp location** command in administration EXEC mode to verify that RP ports (GE1) that are connected to the 22-port SCGE are in the blocked state, and that the RP ports (GE0) that are connected to the active Cat6K are in the forwarding state.

Step 5 Verify that there is no impact to the active topology and the control Ethernet traffic because the active Cat6K remains as the root.

Performing a Failover to a Standby 22-port SCGE (Four-FCC Multishelf System)

To perform a failover to a standby 22-port SCGE and swap the remaining SCGE with the new 22-port SCGEs, perform the following steps:

Step 1 Perform a failover to an FCC0, to the new 22-port SCGE. Use the following syntax for the **redundancy switchover** command, with the **location** keyword, in EXEC mode:

redundancy switchover location *node-id*

Replace the *node-id* argument with the location of the active 2-ports SCGE card.

Step 2 Verify that the failover is completed by using the **show platform** command and **show redundancy** command.

The **show platform** command shows that the 22-port SCGE card is in IOS XR RUN state.

The **show redundancy** command shows that the 22-port SCGE card is in the active state.

Step 3 After the 22-port SCGE becomes active, swap the 2-ports SCGE (active SC) with the new 22-port SCGE card.

Note Do not attempt this step before Step 2 has completed.

Step 4 Use the **show platform** command in EXEC mode or administration EXEC mode to verify that the newly 22-port SCGE is in the IOS XR RUN state.

Step 5 Use the **show redundancy** command in EXEC mode to verify that the newly inserted 22-port SCGE cards are in standby ready.

Step 6 Repeat Step 1 to Step 4 for FCC1, FCC2, and FCC3.

Connecting the 22-port SCGEs into a Full Mesh Configuration (Four-FCC Multishelf System)

To connect the 22-port SCGEs in a full mesh configuration, perform the following steps:

Step 1 Connect all of the 22-port SCGE cards to every other 22-port SCGE cards in the system in a mesh connection topology. Every 22-port SCGE card has seven connections to other 22-port SCGE cards.

Step 2 Verify that all new connections are bidirectional and connected to the right neighbors by using the **show controllers switch inter-rack udld** command, with the **all** and **location** keywords, in administration EXEC mode, as shown in the following syntax:

show controllers switch inter-rack udld {**all location** *node-id*}

Replace the *node-id* argument with the location of all of the 22-port SCGE cards.

Step 3 Verify that all of the connected ports to the 22-port SCGE cards are displayed as either in forwarding (FWD) state or blocked (BLK) state for all of the 22-port SCGE cards in the system by using the **show controller switch inter-rack stp** command, with the **location** keyword, in administration EXEC mode.

The location is used for all of the 22-port SCGE cards in the system.

The following example shows location f0/sc0/cpu0:

```
RP/0/RP0/CPU0:router(admin)# show controllers switch inter-rack stp location f0/sc0/cpu0

##### MST   0 vlans mapped:   2-4094
Bridge        address 5246.48f0.20ff  priority      32768 (32768 sysid 0)
Root          this switch for the CIST
Operational   hello time  1, forward delay  6, max age  8, txholdcount  6
Configured    hello time  1, forward delay  6, max age  8, max hops     4

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- ----------------------------

##### MST   1 vlans mapped:   1
Bridge        address 5246.48f0.20ff  priority      32769 (32768 sysid 1)
Root          this switch for MST1

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- ----------------------------
           GE_13 Desg  FWD    20000 128.  14 P2p
           GE_14 Desg  FWD    20000 128.  15 P2p
           GE_15 Desg  FWD    20000 128.  16 P2p
           GE_17 Desg  FWD    20000 128.  18 P2p
           GE_22 Desg  FWD    20000 128.  23 P2p
```

Transferring an Active Cat6K Gigabit Ethernet Connections to the Active 22-port SCGE (Four-FCC Multishelf System)

To transfer an active Cat6K GE connections to the active 22-port SCGE and isolate the active Cat6K from the control network, perform the following steps:

Step 1 Disable the active Cat6K port that is connected to the active RP on the DSC.

Step 2 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on the active RPs that the GE1 port, which is connected to the 22-port SCGE, goes into the forwarding (FWD) state. The location is the location of the active RP.

Step 3 Shut down the ports on the active Cat6K one at a time, with the exception of the four links between the active Cat6K and the 22-port SCGE. Now, the active Cat6K remains connected to the fabric chassis with four GE links.

Step 4 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on all RPs that the GE1 port, which is connected to the 22-port SCGE, goes into the forwarding state.

Step 5 Move the disabled GE links from the RP to the active Cat6K to the 22-port SCGE. The following locations are listed:

- 0/rp0-GE0 to F0/SC0-GE0
- 0/rp1-GE0 to F2/SC0-GE0
- 1/rp0-GE0 to F1/SC0-GE0
- 1/rp1-GE0 to F3/SC0-GE0

Step 6 Verify that all of the connections are bidirectional and have the correct neighbors by using the **show controller switch inter-rack udld** command, with the **all** and **location** keywords, in administration EXEC mode, as shown in the following syntax.

show controllers switch inter-rack udld {**all location** *node-id*}

Replace the *node-id* argument with the location of all of the 22-port SCGE card.

Step 7 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify on all RPs that the GE0 port, which is connected to the 22-port SCGE, goes into the blocked (BLK) state.

Step 8 Raise the priority of the active Cat6K to 40960, which causes the root to change to the 22-port SCGE on rack FCC0.

Step 9 Use the **show controllers switch inter-rack stp** command in administration EXEC mode to verify that the active SC on FCC0 is the new root switch.

Step 10 Shut down the port that is connected to active Cat6K to each of the 22-port SCGEs.

The migration is complete after you validate the new connections. You can remove the two Cisco Catalyst 65*xx* switches.

INDEX

P

R

S

T